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ACTIVITIES OF THE UNITED NATIONS SYSTEM IN THE FIELD OF WATER AND MINERAL RESOURCES, AND INTER-AGENCY COORDINATION FOCUSING ON PROGRESS MADE TOWARDS ACHIEVING SUSTAINABLE DEVELOPMENT

Activities of the Economic Commission for Latin America and the Caribbean in the area of water resources

Note by the Secretary-General

The report of the Economic Commission for Latin America and the Caribbean in the area of water resources, available in the language of submission, is contained in the annex below.

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Annex

REPORT OF THE ECONOMIC COMMISSION FOR LATIN AMERICA AND THE CARIBBEAN ON THE STATE OF WATER MANAGEMENT IN LATIN AMERICA AND THE CARIBBEAN

Introduction

Over the last two decades, the institutions and nature of water resource management in the countries of Latin America and the Caribbean have undergone considerable modification. Until very recently, however, no general regional trends were observable in these changes. In the last few years, however, there is a noticeable general tendency in the region both towards the decentralization of water management responsibilities and to the application of some of the basic precepts for water resource administration which were enunciated at the United Nations Water Conference, and incorporated in the ***Mar del Plata Action Plan***. Moreover, in the last two years, Agenda 21, adopted at the United Nations Conference on Environment and Development, Rio de Janeiro, 1992, particularly Chapter 18 "***Protection of the quality and supply of freshwater resources: application of integrated approaches to the development, management and use of water resources***" has also begun to influence water management policy in many countries and, consequently, the institutional structure for water resource administration.

So far, however, despite a growing number of examples of improvement in the handling of critical water management issues and in the operation of basic services, there are few genuine examples in the region of institutions specifically charged with responsibility for integrated water management which is fundamental to both the Action Plan and Agenda 21. The reduction of public sector activities in many countries and the transfer of the provision of basic services, such as water supply, irrigation and electricity generation, to the private sector is forcing a reconsideration of water administration structures which may result in the adoption of a more integrated approach towards management. There is a growing recognition in the region of the need to manage the water resource, itself, rather than to concentrate on the uses to which the resource may be put. This is leading to the increasing discussion in many countries of a need to create river basin based management institutions in order to solve conflicts between users, to better manage supply and to permit the better taking account of the impact of water use on the environment.

General trends in Latin America and the Caribbean affecting water management

Public sector investment and the importance of government as a whole in the economy grew continually until very recently in nearly all the countries of the region. Investments in the control and regulation of river flows expanded as part of the general expansion of the public sector and of the role of the government in the economy. Investments in water related projects have accounted for a large proportion of total public investment in the last twenty years. Beyond the confines of water management, in the discussion in Latin America of policies to overcome the economic crisis of the 1980's, much emphasis has been placed on the need to increase the effectiveness of the management of, and the rate of return from both existing and future investments, particularly, investments made in projects in the public sector.

The result of the reconsideration of the role of government and the public sector in the economy and the revival of the faith in markets has been felt within water management and water resource administration. The most common change has been the sale or concession of many water–based productive activities to the private sector. This has been particularly the case with hydroelectric power generation and irrigation, but there is a growing privatization of water supply and sanitation companies. An even more important institutional change has been the decision in some countries to make water rights real property which can be freely transferred without reference to the bureaucracy. This latter innovation is the most symbolic sign of a more general reconsideration and strengthening of the role of users in water administration.

A recent study by ECLAC of the state of water administration in six countries of the region, Argentina, Brazil, Colombia, Chile, Mexico and Venezuela, clearly shows the general directions in which water management policy and the administration of the water resource are moving in the region. The study concluded that,

First, central governments are getting out of the provision of basic water services. Many different procedures are being used to reduce the involvement of the public sector, but among the most common are:

i) The transfer of responsibility from a central government ministry to another public institution such as an autonomous public corporation, to the states or provinces in the federal countries, to a regional authority or a municipality in countries with a unitary system of government.

ii) The transfer of management responsibilities to formally constituted water–user associations. This is particularly common for irrigation and rural drinking water supply.

iii) The granting of water services in concession to autonomous public or private companies. This is particular common for drinking water supply and sanitation, although, it is also being considered for irrigation in some countries.

iv) Direct privatization through the sales of shares or by tender. A normal practice for hydroelectricity generation, although it is also being applied to water supply and sanitation services.

Second, in some countries, water markets have been created or are being considered through the assignment of property rights to the water rights and the permitting of the holders of the rights to freely trade them. Such markets have existed in Chile since the early 1980's.

Third, the decentralization and transfer of water-based services is being accompanied by a trend towards self-financing. There is an increasing requirement in public policies that saleable water services (drinking water, irrigation, and hydroelectricity) finance the total costs from tariff revenues, including the control of the external costs associated with their provision. For example, in Chile the state–owned water supply and sanitation companies generated net revenues equivalent to more than US$ 70 000 000 in 1994. This tendency is accompanied by the newly emerging notion of payment for activities that cause pollution as a new approach to pollution control.

Overall approaches to water management in the countries of the region

Institutional systems for water management vary considerably among the countries of the region due to many factors. Some, such as climate and the relative availability of water, are related to the physical supply of water while others relate to the pace of change in the nature of water management problems or to the intensity of water use, particularly the existence of large scale demand of water for irrigation. Other influential factors include the form of government, whether federal or unitary, centralized or decentralized and, of course, legal traditions.

The most significant difference among administrative systems for water management, however, is the degree of centralization of public sector water management responsibilities within the public administration. The greater the concentration or centralization of water management responsibilities the more effective public sector management appears to be. There is, however, no relationship between the centralization

of water management responsibilities within the public administration and the degree of public intervention in water management. For example, Chile and Cuba, are both countries in which public sector responsibilities are centralized in one institution, in the *Dirección General de Aguas* (DGA) in Chile and in the *Instituto Nacional de Recursos Hidráulicos* in Cuba. In Cuba, there is complete state domination of water management, but in Chile the private sector has traditionally had the most active participation in water use administration of any country in the region and economic incentives rather than administrative regulations play a major role in the process of water management.

In most countries of the region, operational and regulatory functions related to the administration of water resources have, traditionally, been shared among a large number of institutions. Not all of these institutions necessarily form part of the bureaucracy of the central government. Provincial, regional and municipal governments and, on occasion, private agents can play a significant role.

Many countries are characterized by a diffuse allocation of responsibilities for water management. In such systems, no one institution dominates water resource administration and where there is a central coordinating mechanism it tends to be relatively weak. The institutional systems of Argentina, Bolivia, Colombia, El Salvador, Guatemala, Honduras, Jamaica, Paraguay and Uruguay can be categorized as falling into this least centralized class.

Within these administrative systems, which might with justification be described as fragmented, it has been common to decentralize specific functions to autonomous public entities. Public companies for the management of individual water uses, for example, hydroelectric power generation, the provision of drinking water supply and sewerage and the management of irrigation systems, were common. In many countries, these companies were often national in scope, for example, *Obras Sanitarias de la Nación* (OSN) in Argentina, but municipal companies are also characteristic, as in Colombia and Ecuador. Territorial decentralization, in the form of delegation of more general authority over water management to regional development or river basin agencies, has been less common, but this form of decentralization has long been characteristic of Colombia.

In a second group of countries, including Brazil, Costa Rica, Ecuador, Panama and Peru and there is a somewhat greater centralization of water management responsibilities. In this group of countries, there are well established mechanisms for the coordination of policies, usually at the inter-ministerial level reporting most often directly to the president. A special variant of this type of management system is found in Costa Rica and in many of the smaller countries of the Caribbean where the water supply agency, as the agency with responsibility for the predominant water use, acts as the coordinator for water resources policy.

Finally, in four countries of the region, Chile, Cuba, Mexico and Venezuela, responsibility for water resource management policy is concentrated in a single institution, although there are considerable differences in the overall form of their institutional systems. The important characteristic that they share is the consolidation of authority over the management of the resource and its use in one institution. The classic example of this type of institutional arrangement is provided by Mexico. The *Secretaría de Recursos Hidráulicos* (SRH), although basically a construction agency, was wholly responsible for the administration of the water resource in Mexico from 1947 until its replacement by the *Comisión Nacional del Agua* (CNA) in 1989. The SRH was responsible for the formulation and execution of the plan or programme for water resources produced by each successive government. Moreover, in Mexico, in contrast to the other countries of the region with national water plans, there were never competing sectorial plans. The CNA, not so much a construction agency as the emphasis in Mexican water policy has changed towards water resource management, continues in the centralized tradition of the SRH and possesses the authority to define policies, to define and charge for uses, to execute works, and to conduct research into all areas of water resource use and conservation. The CNA is, as the SRH was, one of the most powerful political institutions in Mexico.

Recently, there has been a considerable restructuring of institutional systems in many countries. In Argentina, Brazil, Colombia and Venezuela, the administration of water resources has largely been decentralized to provincial and state governments or regional institutions. Decentralization has been accompanied by a considerable reduction in the staff in the ministries of the central government.

In Argentina, the transfer of functions from the national government to the provinces has, however, tended to perpetuate the previous dispersion of functions in the national administration both among and within the provincial governments. Decentralization has also been accompanied by the privatization of many management activities.

Major water management issues

In general, Latin America and the Caribbean, particularly South America, is a water rich region with little pressure now or for the foreseeable future over the resource as a whole. There are, however, exceptions, particularly among the countries of the Caribbean (Table 1). Elsewhere water scarcity is only a local phenomenon.

Due to the considerable variations in economic, physical and social characteristics among the countries of Latin America and the Caribbean, there are important differences in the nature of the challenges being faced by water management. It is obvious that the issues in Brazil are very different from those in Santa Lucia. At the same time, even

within Brazil, given the size of the country, the issues cannot be the same in the North East as in the Amazon Basin or neither as in São Paulo. Despite these wide degrees of variation and allowing for difference in the dimensions of the issues, there are many areas of common concern.

These common issues can be classified into those relating to institutional structure and those related to the issues directly related to the management of the resource and its use.

The most important institutional issues are:

Table 1

Latin America and the Caribbean: estimated degree of water resources utilization

Water withdrawals as a percentage of water resources (latest available data)			
Low (≤ 2.5%)		Medium (> 2.5%, ≤ 10.0%)	High (> 10.0%)
Belize	Honduras	Argentina	Barbados
Bolivia	Nicaragua	Chile	Cuba
Brazil	Panama	Colombia	Dominican Republic
Costa Rica	Paraguay	El Salvador	Mexico
Ecuador	Suriname	Haiti	Peru
Guatemala	Uruguay	Jamaica	
Guyana	Venezuela	Trinidad and Tobago	

Source: on the basis of World Resources Institute in collaboration with the United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP), ***World resources 1994-95***, Oxford University Press, 1994, ISBN 0-19-521044-1; and S.N. Kulshreshtha, ***World water resources and regional vulnerability: impact of future changes***, RR-93-10, International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria, June 1993, ISBN 3-7045-0120-4.

i) The decentralization of management decision-making and the need to clearly define the role of the State and the role of individuals in water management.
ii) The self-financing of water-related services.
iii) A desire to establish a global set of rules for the integral and sustainable management of water resources.
iv) A growing awareness of the increasingly critical nature of environmental problems.
v) A clear tendency to have marketable water services help finance the externalities associated with their provision.
vi) The emerging notion of payment for activities that cause pollution as a source of financing for water quality management.
vii) The increasing perception that water resource management at the river basin level might be the best approach.

The most important issues for the region as a whole relating to water management are:

i) The supply of water per inhabitant and per unit of economic wealth will inevitably decline, so that conflicts over the water resource will continue to challenge the water management system.
ii) The absence of universal availability of drinking water supply and sanitation.
iii) The serious deterioration in water quality which will require giving increasing priority to adequate water treatment and the elimination of polluting effluents.
iv) The need to consider every river basin as a whole system, as the key to water administration, and thus encouraging the development of integrated basin management.
v) Water management must be a permanent, not temporary, responsibility of government.
vi) The need to ensure that the use of the water resource is based on the concept of integrated water management.
vii) The challenge of constructing a system for evaluating potential environmental impacts and establishing provisions for environmental monitoring of water related activities to ensure that palliative measures are carried out as planned.

The state of the water management infrastructure

As could be expected given the variety of conditions in the region there is considerable variation in the state of water management infrastructure among different sectors as well as among and within countries. In the region as a whole, investment in infrastructure dropped sharply during the 1980's and this affected water management activities along with other sectors. The situation has improved somewhat over the last 5 years, but in many countries the state of the water infrastructure remains far from satisfactory and the

low rate of investment persists. There are, however, some important exceptions, especially in those few countries with high and continuing rates of economic growth. A common trend is the increasing participation of the private sector in the provision and operation of basic water infrastructure.

a. Hydrometeorological and water quality networks and surveys

The long recession in the 1980's led to a general deterioration in data collection programmes and in many countries the basic networks have been reduced. Extensive parts of the region have little or no monitoring. There are river basins in which even the basic elements necessary to calculate the water balance are not known. Groundwater observations are practically nonexistent in many countries.

A recent UNESCO/WMO report on the state of water resources assessment stresses that, in general, hydrometeorological agencies generally have a low priority in government programmes and that a general deterioration in data collection programmes has resulted, particularly at the level of on-going national rather than project-based monitoring. On the other hand, water resource management agencies commonly have in-house assessment capabilities to meet their own needs and can justify allocating resources to related analysis, research and development.

Recently, the proliferation of computers and analytical software has permitted the transformation of routine processing tasks into simple applied research. In addition, the increasing practice of subcontracting research and development studies to universities appears to be an attractive solution which is increasingly being adopted.

The countries, for which information is available, have been classified according to the recognition given to water resources assessment as low (El Salvador), medium (Argentina, Bolivia, Dominican Republic, Honduras,Paraguay and Peru) and high (Barbados, Brazil, Chile, Colombia, Costa Rica, Mexico, Panama, Uruguay and Venezuela). In respect of the availability of resources and technology, they were classifies as low (Bolivia, El Salvador and Honduras), medium (Brazil, Colombia, Costa Rica, Panama, Paraguay, Peru and Uruguay) and high (Argentina, Barbados, Chile, Dominican Republic, Mexico and Venezuela).

Water quality networks are particularly little developed and in many countries of the region even laboratories for the control of drinking water quality are deficient. There has been, however, an expansion of the monitoring of water quality in the more industrialized countries, especially in Argentina, Brazil, Chile and Mexico which has accompanied the strengthening of water quality control legislation and of the responsible institutions. The GEMS network has, however, ceased to function in the region, and only now is an attempt being made by UNEP to resuscitate it.

b. The physical infrastructure

The quality of the physical structure is again very variable in the region. It tends to be better in hydroelectricity and worse in irrigation. It tends to be better where there is more private or local public responsibility for its management. It tends to be better in Mexico, in the countries of the Southern Cone and in the richer Caribbean countries. It tends to be better in larger cities then in rural areas and smaller towns.

Distribution and operation losses are high in most drinking water supply and electricity systems. System losses are, on average, almost double those regarded as acceptable for efficient service. In water supply distribution, in the best run companies losses amount to a one-third of the water pumped, although in Santiago, Chile they are now below the European average. Overall it is estimated that the usual losses are between 40 and 60 percent of water pumped due to the age of pipes and their general physicochemical deterioration as well as deficiencies in commercial management. The result, of course, is that in many countries the quality of delivered water is not acceptable; access to a public source and even having a household connection do not guarantee the potability of the water in the dwelling, even when the water is potable at the source.

The worst aspect of the situation is the continuing lack of universal access to water supply services in many countries (Table 2) and the tendency for coverage to stagnate and even to decline. This is coupled, however, with a lack of continuous supply as well as deficient quality control. Many water supply systems do not provide, or have serious operational problems that interfere with, effective and continuous disinfection. In sanitation the situation tends to show even more dramatic deficiencies in coverage, in the lack of maintenance and in the general absence of effective disposal. PAHO reports that less than 10% of the sewerage systems in Latin America and the Caribbean have waste treatment plants and where plants have been built many are out of service. However, some countries have announced ambitions programmes to improve wastewater treatment.

Table 2

Latin America and the Caribbean: water supply and sanitation
(Population in millions)

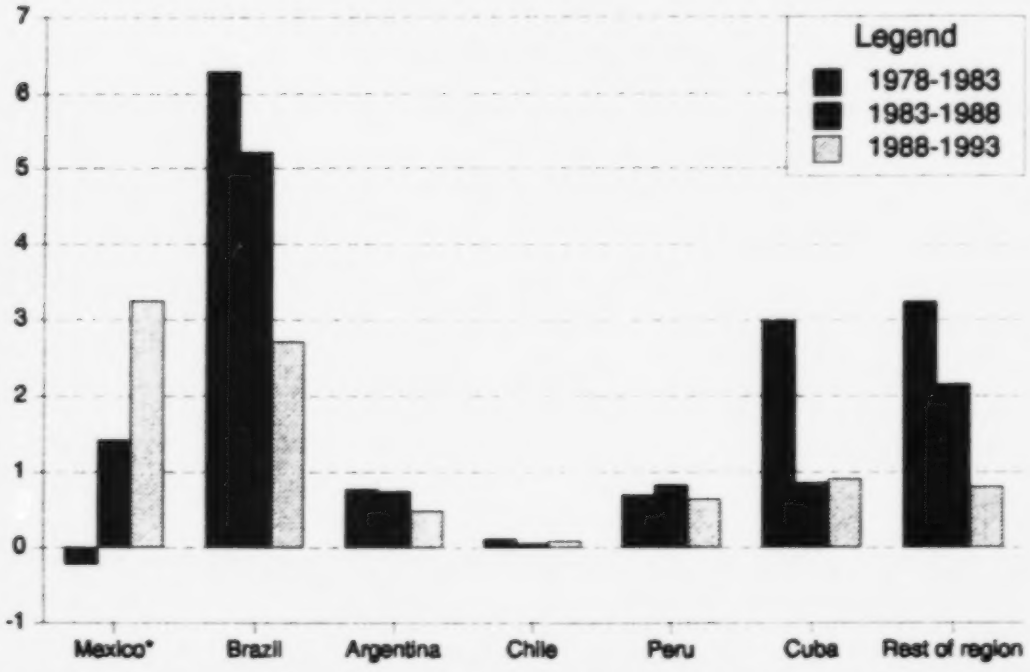
	Urban areas		Rural areas	
	Water supply	Sanitation	Water supply	Sanitation
Coverage in 1990[1]				
Number of persons served	282	262	64	42
Coverage (%)	90	83	51	33
Number of persons unserved	32	52	61	84
Coverage in 1994[1]				
Number of persons served	306	254	70	42
Coverage (%)	88	73	56	34
Number of persons unserved	42	94	55	82

Urban drinking water supply coverage (1992)[2]			Urban sanitation coverage (1992)[2]		
High (≥ 95%)	Medium (< 95%, ≥ 80%)	Low (< 80%)	High (≥ 90%)	Medium (< 90%, ≥ 75%)	Low (< 75%)
Bahamas	Bolivia	Argentina	Argentina	Belize	Bolivia
Barbados	Colombia	Dominican Rep.	Bahamas	Brazil	Colombia
Belize	Guatemala	Ecuador	Barbados	Dominican Rep.	Ecuador
Brazil	Honduras	Haiti	Chile	Guatemala	Haiti
Chile	Jamaica	Nicaragua	Cuba	Guyana	Peru
Cuba	Mexico	Peru	El Salvador	Jamaica	Suriname
El Salvador	Trinidad & Tob.	Suriname	Honduras	Mexico	Trinidad & Tob.
Guyana	Uruguay	Venezuela	Uruguay		Venezuela

Source: [1] - United Nations, General Assembly, Economic and Social Council, ***Progress made in providing safe water supply and sanitation for all during the first half of the 1990s. Report of the Secretary-General***, A/50/213, E/1995/87, 8 June 1995, General Assembly, Fiftieth session, Report of the Economic and Social Council; and [2] - Pan American Health Organization (PAHO), ***Las condiciones de salud en las Américas. Edición de 1994. Volumen I***, Publicación Científica Nº 549, Washington, D.C., 1994. ISBN 92 75 31549 3.

Figure 1

Latin America and the Caribbean: average annual growth rate of the area under irrigation
(Percent)



Source: Food and Agriculture Organization of the United Nations (FAO), *FAO yearbook. Production. Vol. 48. 1994*, FAO Statistics Series Nº 125, Rome, 1995. ISBN 92-5-003679-5.
Note: * - apparently includes the rehabilitation of existing infrastructure.

Losses through the poor maintenance of irrigation systems are reported throughout the region. In general, efficiencies in water application are very low, although better in areas of production of high value crops for export. FAO reports continuing increase in the area under irrigation (Figure 1), but this is due more to the completion of old projects and new expansions are likely to be limited as governments retreat from direct investments in irrigation schemes.

There are no universal systems for the registration of water uses in any country of the region. In the countries with traditional extensive area under irrigation partial or informal registration of users has always existed. In many of the countries, these systems are being upgraded, especially as greater responsibility for management is transferred to the users. In those countries which have adopted or are considering the use of water

markets as a means of achieving efficiency in water use, such as Chile, Peru and Bolivia, the registration of the holders of water rights is essential. In Mexico and in Chile national surveys have recently been made to establish registers of waste water dischargers for the purpose of establishing pollution control programmes and in the case of Mexico a system of effluent charges.

In 1985, Brazil began a programme to register all users of water for irrigation purposes, but the programme has suffered a number of interruptions and has not been completed.

The achievement of the major goals established under Agenda 21

Despite all the limitations on the development of water resources and their use in Latin America and the Caribbean, it is possible to be relatively optimistic about the ability of most countries of the region to meet the major goals established under Agenda 21. The drastic reforms in institutional structure, the opening of many water management activities to the private sector and the increasing emphasis placed on efficiency and self-financing have removed many of the barriers which existed in the way of achieving better management. This opinion holds for all the major areas for which goals were established under Agenda 21.

a. Integrated water resource development and management

The context in which water administration is discussed has changed in many countries. The emphasis on decentralization and private participation has created the opportunity to discuss integrated management of the resource and a real possibility for the adoption of institutional arrangements based on the concept of integrated river basin management. This is especially the case where, there has been a transfer of operational responsibilities away from the institutions of the central public administration to local government, to autonomous public companies or to the private sector.

In various countries of Latin America and the Caribbean, for example in Argentina, Brazil, Chile, Mexico, Peru and Venezuela, management of the water resource through some form of river basin institution is increasingly being considered as the most appropriate way of internalizing the external costs of the development and use of the water resources. There is still, however, a noticeably strong emphasis on the study of the physical components of the systems, or on sectoral activities and investments. The organizational component for the creation of river basin authorities, by far the most

important aspect in the development of this approach to water management, is as yet little developed, but the experience is growing.

b. Water resource assessment

Few countries of the region have coordinated water resource assessment activities. It is normally the case, Colombia is one exception, that the meteorological and hydrological services are provided by separate entities. Additionally, it is common to find that hydrologic information is collected by a variety of different agencies and there is an absence of any central data collection and processing. This characteristic is likely to act as a restraint in the achievement of the recommendations establish in Chapter 18 of Agenda 21 that *inter alia*:

- to ensure that assessment information is fully utilized in the development of water management policies;
- to establish the institutional arrangements needed to ensure the efficient collection, processing, storage, retrieval and dissemination to users of information about the quality and quantity of available water resources at the level of catchments and groundwater aquifers in an integrated manner; and
- to have sufficient numbers of appropriately qualified and capable staff recruited and retained by water resources assessment agencies and provided with the training and retraining they will need to carry out their responsibilities successfully.

c. Protection of water resources, water quality and aquatic ecosystems

The incorporation into public policies of concern for the protection of the resource, water quality and aquatic ecosystems is increasingly being discussed and acted on. In many countries of the region, the continuing degradation of water quality is seen as the major challenge facing water management. In general, however, pollution control is the area where there is least management experience in the region. As one policy response, a new type of water right is beginning to make an appearance, payments for the right to pollute, or to discharge. For example, Mexico, to meet the demands associated with the environmental agreements entered into under the North American Free Trade Agreement (NAFTA), has introduced a system of discharge charges under the Federal Water Rights Law. In both Argentina and Chile, the institutions responsible for water quality control have recently been strengthened.

It is obvious to most governments that there is a need for policies and strategies for controlling pollution; for establishing information bases on pollutants and water

quality; to develop useful technology for pollution control and treatment of wastes; to advance in institutional development; and to establish appropriate financing mechanisms.

At the same time, concern for the impact of economic development on the natural environment together with the increasing awareness of the close interrelationship between poverty, especially rural poverty, and environmental degradation has placed environmental management in the forefront of political discussion. In the discussion, the management of water resources is sometimes interpreted as simply one more component within the institutional arrangement for the management of the environment. This has led to claims, as in Argentina and Colombia, that sight has been lost of the "uniqueness" of water and of its primary role in the sustenance of environmental systems. On the other hand, in other countries, such as Chile and Mexico, increasing concern for the environment has resulted in the strengthening of water management institutions through the first serious attempts to safeguard water quality by the control of water pollution from both domestic and industrial sources.

d. Drinking water supply and sanitation

The reforms that have been and are being made in drinking water supply and sanitation should lead in most cases not only to an improvement in coverage, but, also to a reversal of the decline in the proportion of the population enjoying service. Most governments have accepted that widening the possibilities for private participation in the provision of water supply and sanitation will both solve the problem of financing the necessary capital investment and that of the efficiency of the management of the services. Chile provides an example, however, of what can be achieved when the correct incentives are provided under continuing public ownership.

There is sufficient experience in the countries of the region to meet all the recommendations contained in Chapter 18 in respect of drinking water supply and sanitation and great strides can be anticipated if a relatively high rate of economic growth can be maintained. The only area where progress will be more difficult is in the treatment of sewage where, despite the efforts being made, it cannot be expected that the major cities will have universal treatment until after 2020.

e. Water and sustainable urban development

The growth of large urban centres has been such in Latin America that some are among the largest concentrations of population and economic activity in the world. As could be expected, the growth of these huge urban agglomerations has had a series of repercussions on the water resource and on the environment, as a whole. One recent sad example has been the cholera epidemic which was clearly related to deficiencies in the management

of water and it showed beyond any doubt that the relationship between water management and sustainable urban development is far from being resolved in the region.

Despite the importance of the good management of the water resource to the metropolitan regions of Latin America and the Caribbean, in no country is there an adequate management structure to manage the water resources compromised by urban growth. In fact, in many countries, the existing institutional systems hamper, rather than promote, an effective management of the relationship between urban growth and the water resource.

A recent ECLAC study shows that many elements inherent in adequate water management are ignored or not recognized. This is obvious, for example, in respect of infrastructure management in many metropolitan regions, but it is not limited to this. It is rare that there is effective control over the occupation of land subject to flooding, landslides or erosion. These failures have serious results both for urban management in general as for water management in particular.

Although there is little evidence that institutional form is determinant in improving management performance, there does appear to be advantages in an institutional structure which permits public debate on the metropolitan water problems. The important factor is ensuring that, whatever the management system, the management is dynamic. It is clear, nevertheless, that the creation of a clear distinction between the management of the resource, itself, on the one hand, and the management of its use, on the other, can be very beneficial.

Each urban region needs a space where the issues inherent in achieving sustainable urban development and in achieving the recommendations contained in Chapter 18 can be examined. This should not mean the creation of a new bureaucratic institution, but simply better coordination between national water management institutions and those responsible for the management of the urban centres, particularly, the municipalities and the private sector.

At the same time, it is necessary to strengthen the financial basis of urban institutions responsible for aspects of water management. On of the major obstacles to improved management remains the financial weakness of many urban institutions including water supply and sanitation companies, but often even more serious in the case of institutions responsible for the management of drainage and related matters. The only solution is self-financing. If this cannot be achieved than further degradation of urban water systems is inevitable and a chance will be lost to achieve sustainable urban development in the foreseeable future.

f. Water for sustainable food production and rural development

In general, in the countries of Latin America and the Caribbean, the question of rural development and food production is being transferred almost entirely to the private sector. The role of governments is being restricted more and more to one of support of private initiatives. The major exception is in the continuing support of the poorer farmers, but again with a strong emphasis on the subsidies of the efforts of the population themselves for self-improvement.

It cannot be anticipated, despite some ambitious plans, that in the achievement of the recommendations in this area that the governments will undertake major programmes. One example, of what might be expected is provided by the large scale transfer of responsibility for irrigation management to farmers. This has been accompanied by a steady decline in the rate of increase in the area under irrigation as greater emphasis is placed on improving the performance of existing irrigated areas.

Prior to the recent changes, water management for rural development was largely in the hands of central government agencies responsible both for the water resource itself, the natural supply of water and for the management of the use of water. Although there was always a considerable proportion of irrigation under private management, in general, however, the private sector was constrained from participation in management of systems constructed with public funds. Mexico provides the model example of this period in water management in irrigated agriculture and even in Mexico, the majority of irrigation districts have been transferred to farmer management.

The recent rationalization, decentralization and privatization of management responsibilities has brought about an unprecedented change in the institutional environment for rural water management and the associated production of food and other crops. Many new nontraditional actors, largely from the private sector and including multinational companies, have entered into the management and decision–making process. Where this process was closed, it is now open and competitive.

One important aspect of the criticisms made of the traditional approach turns on the lack of consideration of the environmental consequences of water management decisions and the consequent damaging environmental effects of many decisions to construct works and assign water use. It is arguable that the over–centralization of any activity is likely to lead to sub–optimum decisions and, especially, to a failure to consider their wider implications. A consequence is the ignoring of the environmental effects or impact of decisions. The more open and participatory the process of decision-making is, the more probable it is that all aspects of the decision will receive consideration.

Obviously, this does not mean that perfection will be achieved, but only that better decisions and more sustainable rural development can be the result.

Conclusions

Progress towards sustainable and integrated water resource management in Latin America and the Caribbean is still hindered by many factors. One of the most important is the deficiency in the provision of effective and efficient drinking water supply and sanitation services. This important and growing social need, intensified by the appearance of cholera in 1991, results in the achievement of sustainable water management being given a distant second priority by both political decision-makers and the public.

It is noticeable, however, that those countries with more effective water management respond more coherently and rapidly to both ongoing management issues and to emergencies such as that posed by the cholera epidemic, as in Chile and Costa Rica, or by natural disasters related to water, as in Cuba. Where the water authorities are weak or disperse, response to both emergencies and permanent management issues often consists in a multitude of overlapping efforts, with no clear impact, continuity or guarantee. In the same way, where the water sector is better organized, reform has been more rapid and effective.

In most countries of the region, the role of the state in the economy has been fundamentally revised. The objective of this revision is the reduction or redirection of state expenditures, especially capital investment, in conditions of fiscal austerity. This reduction has been accompanied by attempts to increase the efficiency of the provision of services by transferring responsibilities to the private sector or, at the least, to financially autonomous public companies or to the municipalities. One of the results of this policy has been to leave the central public administrations with responsibility for licensing and supervising the activities of third parties, but not for the operation of productive activities related to water.

The adoption of such policies is far from even among the countries of the region. Some countries are still in the midst of macroeconomic stabilization. A few have a decade of stable policies and economic growth behind them. The reconsideration of the role of the state in water management is, however, general and marks a major change in water administration policies which had been in existence for more than fifty years. The steady expansion of the public sector in water management has been reversed. The context in which water administration is discussed has changed. The emphasis is on decentralization and private participation. The opportunity has possibly been created for the general adoption of institutional arrangements based on the concept of integrated river basin management of the water resource, by the removal of operational responsibilities away

from the central public administration to local government, to autonomous public companies or to the private sector.

In various countries of Latin America and the Caribbean, for example in Brazil, Chile, Mexico and Peru, management of the water resource through some form of river basin institution is increasingly being considered as the most appropriate way of internalizing the external costs of the development and use of the water resources. There is still, however, a noticeably strong emphasis on the study of the physical components of the systems, or on sectoral activities and investments. The organizational component for the creation of river basin authorities, by far the most important aspect in the development of this, perhaps the only sustainable, approach to water management, is still very little developed.